

## **PHASE ERROR DETECTOR USING I/Q INTERFERENCE CANCELLATION**

### **ABSTRACT:**

A method is presented for estimating a phase error for first ( $r_I$ ) and second ( $r_Q$ ) orthogonal signal components spread respectively by different first  $c_I$  and second  $c_Q$  spreading codes. A cross-despread value  $I_dQ$  and/or  $Q_dI$  is determined by despread one signal component with the spreading codes associated with the other signal component ( $r_I$  with  $c_Q$  or  $r_Q$  with  $c_I$ ). In parallel, the same signal component is also despread with its associated spreading code to determine an estimated data symbol for that component. An interference of  $Q$  into  $I$  or  $I$  into  $Q$  is calculated and multiplied by the estimated data symbol, and subtracted from the cross-despread value to achieve an estimate of phase error. Preferably, both cross-despread values are obtained, normalized to a common data rate, scaled to maximize signal to noise ratio, and combined into one phase error estimate. A phase error detector includes despreaders, multipliers, and adders to determine the cross-despread value and subtract the interference from it.